# SAF-B04-002 100 BC Burial Grounds – Soil Full Protocol FINAL VALIDATION PACKAGE

### COMPLETE COPY OF VALIDATION PACKAGE TO:

**Matt Cutlip** 

(1)

Wib 3.54-06

Jeanette Duncan (2)

MID- 3-29-05

RECEIVED APR 0.5 700

**EDMC** 

SDG H2998 SAF-B04-002

Sample Location/Waste Site: 100-B-16

Date:

14 March 2005

To:

Bechtel Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project: 100 BC Burial Grounds - Soil Full Protocol - Waste Site 100-B-16

Subject: Semivolatile - Data Package No. H2998-LLI (SDG No. H2998)

### INTRODUCTION

This memo presents the results of data validation on Data Package No. H2998-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
J02FL8	1/25/05	Soil	С	See note 1
J02FL9	1/25/05	Soil	С	See note 1
J02FM0	1/25/05	Sojl	С	See note 1
J02FM1	1/25/05	Soil	С	See note 1
JO2FM2	1/25/05	Soil	С	See note 1
J02FM3	1/25/05	Soil	С	See note 1

<sup>1-</sup>Semivolatiles by 8270C.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, December 2001). Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

### **DATA QUALITY OBJECTIVES**

### Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

#### Method Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

Due to method blank contamination, all di-n-butylphthalate and bis(2-ethylhexyl)phthalate results were raised to the RQL, qualified as undetected and flagged "U".

All other method blank results were acceptable.

### Field Blanks

One equipment blank (J02FM3) was submitted for analysis. Diethylphthalate, di-n-butylphthalate and bis(2-ethylhexyl)phthalate were detected in the field blank. Under the BHI statement of work, no qualification is required. All other field blank results were acceptable.

### Accuracy

### Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent

recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

All accuracy results were acceptable.

### Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

#### Precision

### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All precision results were acceptable.

### Field Duplicate Samples

One set of field duplicate samples (JO2FM1/JO2FM2) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

### Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. Forty-eight analytes were reported above the RQL. Under the BHI statement of work, no qualification is required. All other analytes met the RQL.

### Completeness

Data package No. H2998-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### MAJOR DEFICIENCIES

None found.

### **MINOR DEFICIENCIES**

Due to method blank contamination, all di-n-butylphthalate and bis(2-ethylhexyl)phthalate results were raised to the RQL, qualified as undetected and flagged "U".

Forty-eight analytes were reported above the RQL. Under the BHI statement of work, no qualification is required.

### REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 3, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, December 2001.

# Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- Indicates presumptive evidence of a compound at an estimated value.
   The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

### SEMIVOLATILE DATA QUALIFICATION SUMMARY\*

SDG: H2998	REVIEWER: TLI	DATE: 3/14/05	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
bis(2-ethylhexyl)phthalate di-n-butylphthalate	U at RQL	All	Method blank contamination

<sup>\* -</sup> The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

### Appendix 3

**Qualified Data Summary and Annotated Laboratory Reports** 

Project: BECHTEL-HANFORD													
Laboratory: LLI				1									
Case:	SDG:	H2998		1									
Sample Number		J02FL8		J02FL9		J02FM0		J02FM1		J02FM2		J02FM3	
Remarks										Duplicate		E. Blank	
Sample Date		1/25/05		1/25/05		1/25/05		1/25/05	-	1/25/05		1/25/05	5
Extraction Date		2/2/05		2/2/05		2/2/05		2/2/05		2/2/05		2/2/05	
Analysis Date		2/4/05		2/4/05		2/4/05		2/4/05		2/4/05		2/4/05	
Semivolatile (8270C)	RDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	la 🗀	Result	Q
Phenoi	660	360	U	370	U	360	U	390	_	360	u	330	
bis(2-Chloroethyl)ether	660	360	Ų	370	U	360	υ	390	Ū	360	Ū	330	
2-Chlorophenol	660	360	U	370	U	360	U	390	Ū	360	<u></u>	330	
1,3-Dichlorobenzene	660	360		370	U	360	Ū	390	u	360		330	
1,4-Dichlorobenzene	660	360		370	U	360	U	390	U	360		330	
1,2-Dichlorobenzene	660	360	U	370	U	360	U	390	U	360		330	_
2-Methylphenol	660	360	U	370	U	360	U	390	U	360	Ū	330	
2,2'-oxybis(1-chloropropane)	660	360	U	370	Ü	360	Ū	390	U	360	U	330	
3 and/or 4-Methylphenol	660	360	υ	370	U	360	Ū	390	U	360	U	330	
N-Nitroso-di-n-propylamine	660	360	U	370	U	360	U	390	J	360	U	330	lū
Hexachloroethane	660	360	U	370	U	360	U	390	U	360	U	330	
Nitrobenzene	660	360	U	370	U	360	U	390	U	360	υ	330	+
Isophorone	660	360	υ	370		360	U	390	Ų	360	U	330	U
2-Nitrophenol	660	360	U	370	U	360	U	390	υ	360	U	330	Ū
2,4-Dimethylphenol	660	360		370		360	U	390	υ	360	U	330	U
bis(2-Chloroethoxy)methane	660	360		370		360	U	390	υ	360	Ü	330	U
2,4-Dichlorophenol	660	360	U	370	U	360	U	390	U	360	Ù	330	U
1,2,4-Trichlorobenzene	660	360	•	370	U	360	U	390	U	360	U	330	U
Naphthalene	660	360		370	υ	360	U	390	U	360	U	330	U
4-Chloroaniline	660	360		370	U	360	U	390	U	360	Ų	330	U
Hexachlorobutadiene	660	360	_	370		360	U	390	IJ.	360	U	330	U
4-Chloro-3-methylphenol	660	360		370	_	360	U	390	ב	360	U	330	U
2-Methylnaphthalene	660	360		370	U	360	U	390	Ü	360	U	330	U
Hexachlorocyclopentadiene	660	360		370		360	U	390	U	360	U	330	u
2,4,6-Trichlorophenol	660	360		370	-	360	١	390	ป	360	U	330	Ų
2,4,5-Trichlorophenol*	660	910		920		900	U	980	٠	910	U	830	U
2-Chloronaphthalene	660	360		370	_	360	-	390	U	360	U	330	U
2-Nitroaniline*	660	910	U	920	_	900	U	980	U	910	U	830	Ū
Dimethylphthalate	660	360	_	370	U	360	U	390	U	360	U	330	U
Acenaphthylene	660	360		370	ŭ	360	U	390	U	360	U	330	U
2,6-Dinitrotoluene	660	360	U	370	U	360	U	390	U	360	Ü	330	U

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roject: BECHTEL-HANFORD				1									
Laboratory: LLI				1									
Case:	SDG:	H2998		1									
Sample Number		J02FL8		J02FL9		J02FM0		J02FM1		J02FM2		J02FM3	$\neg$
Remarks		Ï.								Duplicate		E. Blank	
Sample Date		1/25/05		1/25/05		1/25/05		1/25/05		1/25/05		1/25/05	
Extraction Date		2/2/05		2/2/05		2/2/05		2/2/05		2/2/05	-	2/2/05	
Analysis Date		2/4/05		2/4/05		2/4/05		2/4/05		2/4/05		2/4/05	
Semivolatile (8270C)	RDL	Result	Q	Result	Q		Q	Result	Q	Result	Q	Result	Q
3-Nitroaniline*	660	910	U	920	U	900	Ū	980	U	910	Ü	830	
Acenaphthene	660	360	U	330	U	360	U	390	U	360		330	
2,4-Dinitrophenol*	660	910		920	U	900	Ū	980	J	910	U	830	
4-Nitrophenol*	660	910	U	920	U	900	Ų	980	U	910	U	830	
Dibenzofuran	660	360	-	370	U	360	U	390	U	360	U	330	
2,4-Dinitrotoluene	660	360		370	U	360	U	390	U	360	U		
Diethylphthalate	660	360		370	Ü	360	U	390	U	360	Ū	30	<u> </u>
4-Chlorophenyl-phenyl ether	660	360		370	U	360	U	390	U	360	U	330	U
Fluorene	660	360		370		360	U	390	U	360	Ū	330	U
4-Nitroaniline*	660	910		920	U	900	Ü	980	U	910	U	830	U
4,6-Dinitro-2-methylphenol*	660	910	اد	920	U	900	U	980	Ü	910	Ü	830	υ
N-Nitrosodiphenylamine	660	360	رد	370	U	360	U	390	U	360	U	330	U
4-Bromophenyl-phenyl ether	660	360	ט	370	U	360	U	390	J	360	Ū	330	U
Hexachlorobenzene	660	360	ردا	370	U	360	U	390	U	360	Ū	330	
Pentachlorophenol*	660	910	ح	920	U	900	U	980	Ü	910	U	830	U
Phenanthrene	660	360		370	υ	360	U	63		360	U	330	
Anthracene	660	360	IJ	370		360	U	390	υ	360	U	330	
Carbazole	660	360	-	370		360	U	390	J	360	U	330	U
Di-n-butylphthalate	660	660		660		660	U	660	U	660	U	660	U
Fluoranthene	660	360		370	Ų	22		150.		360	U	330	U
Pyrene	660	360	U	370	U	18		120		360	U	330	U
Butylbenzylphthalate	660	360		370	U	360	U	390	Ų	360	IJ	330	J
3,3'-Dichlorobenzidine	660	360		370	IJ	360	U	390	U	360	U	330	J
Benzo(a)anthracene	660	360		370		360	U	26		360	U	330	U
Chrysene	660	360		370		360	Ü	110		360	U	330	U
bis(2-Ethylhexyl)phthalate	660	660		660		660	ב	660	U	660	U	660	U
Di-n-octylphthalate	660	360		370		360	J	390	U	360	U	330	U
Benzo(b)fluoranthene	660	360		370		360		61		360		330	U
Benzo(k)fluoranthene	660	360		370		360		46		360	U	330	U
Benzo(a)pyrene	660	360		370		360	U	21		360	Ū	330	U
Indeno(1,2,3-cd)pyrene	660	360	_	370	U	360	U	390	U	360	U	330	U
Dibenz(a,h)anthracene	660	360		370	U	360	U	390	Ū.	360	Ü	330	U
Benzo(g,h,i)perylene	660	360	U	370	U	360	U	390	U	360	U	330	
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Report Date: 02/09/05 14:13

### Lionville Laboratory, Inc.

Semivolatiles by GC/MS, HSL List

RFW Batch Num	ber: 0501L688	Client:		NFORD B04	_			COrder: 11				Page: 1a	
	Cust ID:	J02FL8	1	J02FL9		J02FL9		J02FL9		J02FM	0	J02FM	1
Sample Information	RFW#: Matrix:	001 SOIL		002 SOIL	_	002 MS		002 MSD SOIL		SOIL		00 SOIL	i
	D.F.:	1.0		1.0		1.0		1.0		1.			00
	Units:	UG/F	(G	UG/K	G	UG/K	.G	UG/K	G	UG/	KG	UG/	KG
	Nitrobenzene-d5	83	*	78	क्ष	67	8	63	¥	63	*	63	*
Surrogate	2-Fluorobiphenyl	89	*	77	¥	72	¥	67	왐	68	8	64	*
Recovery	Terphenyl-d14	94	*	84	¥	81	*	76	ક	78	*	75	₹
	Phenol-d5	82	*	74	ક	67	ક્ષ	63	ક્ષ	57	ક	60	윰
	2-Fluorophenol	84	*	75	*	68	¥	62	8	58	*	62	ક
	2,4,6-Tribromophenol	97	*	83	ક	85	ŧ	87	*	64	*	69	*
======================================		=======											
Phenol		360	U	370	U	62	*	61	8	360		390	
	ethyl)ether	360	U	370	U	370	U	370	U	360		390	
2-Chloropheno	01	360	U	370	U	67	8	64	*	360		390	
1,3-Dichlorob	penzene	360	U	370	U	370	Ū	370	U	360		390	
1,4-Dichlorob	penzene	360	U	370	U	55	*	57	*	360		390	
	penzene	360	U	370	U	370	U	370	U	360		390	
	01	360	U	370	Ū	370	U	370	Ü	360		390	
2,2'-oxybis(1	1-Chloropropane)	360	U	370	Ū	370	U	370	U	360		` 390	
	enol	360	U	370	U	370	U	370	U	360		390	
	-n-propylamine	360	U	370	Ū	65	ક	66	¥	360		390	
Hexachloroeth	hane	360	บ	370	U	370	U	370	U	360		390	
		360	U	370	U	370	U	370	U	360	-	390	
Isophorone		360	Ü	370	U	370	Ū	370	U	360	_	390	
2-Nitrophenol		360	บ	370	U	370	U	370	Ü	360		390	ט כ
2,4-Dimethyl	phenol	360	U	370	U	370	U	370	U	360		390	ט כ
bis(2-Chloro	ethoxy)methane	360	U	370	U	370	U	370	U	360	-	390	ט כ
2,4-Dichloro	phenol	360	U	370	U	370	U	370	U	360		390	ט כ
	orobenzene	360	U	370	U	58	ક	58	¥	360		390	ט כ
Naphthalene_		360	U	370	U	370	U	370	U	360	-	390	
4-Chloroanil	ine	360	U	370	Ū	370	U	370	Ū	360		390	
Hexachlorobu		360	U	370	U	370	U	370	U		U		U O
4-Chloro-3-m	ethylphenol	360	Ū	370	Ŭ	74	*	72	ક્ષ	360		390	
2-Methylnaph		360	U	370	U	370	Ū	370		360		390	
	clopentadiene	360	U	370	U	370		370		360		390	
2,4,6-Trichle	orophenol	360	U	370	U	370	U	370		360		39	O U
2,4,5-Trichle	orophenol	910	U	920	U	920	บ	920		900	U	98	U 0
	of EPA CLP QC limits.							R-	- /	/-			

Page: 1b

Client: TNUHANFORD B04-002 H2998

RFW Batch Number: 0501L688

Work Order: 11343606001

N3/17/61

Report Date: 02/09/05 14:13

### Lionville Laboratory, Inc.

Semivolatiles by GC/MS, HSL List

Client: TNUHANFORD B04-002 H2998 Work Order: 11343606001 Page: 2a RFW Batch Number: 0501L688 J02FM3 SBLKEI SBLKEI BS Cust ID: J02FM2 RFW#: 005 006 05LE0081-MB1 05LE0081-MB1 Sample SOIL SOIL SOIL Information Matrix: SOIL 1.00 1.00 1.00 D.F.: 1.00 UG/KG UG/KG UG/KG Units: UG/KG 63 ક 82 79 Ł 75 ž Nitrobenzene-d5 63 ¥ 82 ¥ 2-Fluorobiphenyl 87 ¥ 75 Surrogate 83 ¥ 98 ¥ Ł 103 Terphenyl-d14 129 Recovery 59 76 \$ ¥ 77 Phenol-d5 84 62 77 2-Fluorophenol 89 ş. 78 95 2.4.6-Tribromophenol 1 68 66 ł 114 330 330 IJ 70 ¥ 360 U U Phenol 360 U 330 U 330 U 330 U bis(2-Chloroethyl)ether 330 U 330 U 2-Chlorophenol 360 U 74 \* 1.3-Dichlorobenzene\_\_\_\_\_ 360 U 330 U 330 U 330 U 1.4-Dichlorobenzene\_ 360 U 330 U 330 U 69 1,2-Dichlorobenzene 360 U 330 U 330 U 330 U 2-Methylphenol 360 U 330 U 330 U 330 U 2,2'-oxybis(1-Chloropropane) 360 U 330 U 330 U 330 U 3/4-Methylphenol\_\_\_\_\_ 360 U 330 U 330 U 330 U N-Nitroso-di-n-propylamine 360 U 330 U 330 U 76 Ł Hexachloroethane\_\_\_\_ 360 U 330 U 330 U 330 U Nitrobenzene \_\_\_\_ 360 U 330 U 330 U 330 U Isophorone 360 U 330 U 330 U 330 U 2-Nitrophenol 360 U 330 U 330 U 330 IJ 2,4-Dimethylphenol\_\_\_\_ 360 U 330 U 330 U 330 U bis(2-Chloroethoxy)methane\_\_\_\_ 360 U 330 U 330 U 330 U 2,4-Dichlorophenol 360 U 330 U 330 U 330 7/12/0° 1.2.4-Trichlorobenzene 360 U 330 U 330 U 69 Naphthalene 360 U 330 U 330 U 330 U 4-Chloroaniline 360 U 330 U 330 U 330 U Hexachlorobutadiene 360 U 330 U 330 U 330 U 4-Chloro-3-methylphenol 360 U 330 U 330 U 86

330 U

330 U

330 U

830 U

330 U

330 U

330 U

830 U

330 U

330 U

330 U

830 U

360 U

360 U

360 U

910 U

\*= Outside of BPA CLP QC limits.

Hexachlorocyclopentadiene\_\_\_\_

2,4,6-Trichlorophenol \_\_\_\_

2-Methylnaphthalene

2,4,5-Trichlorophenol

RFW Batch Number: 0501L688  Cust ID:	Client: TNUHAN J02FM2	J02FM3	SBLKE		(OL)	COrder: 113 SBLKEI BS	343606001	<u>Page</u>	: 2 <u>1</u>
cust ID.	0000					v.			
RFW#:	005	006	05LE0	081-ME	31	05LE0081-M	31		
2-Chloronaphthalene	360 U	330 (	J	330	U	330	U		
?-Nitroaniline	910 U	830 T	J	830	U	830	U		
Dimethylphthalate	360 U	330 (	J	330	U	330	ប		
Acenaphthylene	360 U	330 t		330	U	330	ט		
2,6-Dinitrotoluene	360 U	330 t	J	330	Ū	330	U		
3-Nitroaniline	910 U	830 T	J	830	U	830	U		
		330 t	j	330	U	. <b>74</b>	*		
Acenaphthene	910 U	830 t	J	830	U	830	ט		
-Nitrophenol	910 U	830 (	J	830	U	14	*		
Dibenzofuran		330 (		330		330	υ		
2,4-Dinitrotoluene		330 (		330		77	*		
Diethylphthalate	360 U	30 (		330	U	330	ט		
-Chlorophenyl-phenylether	360 U	330 (	J	330	U	330	ប		
Pluorene		330 (		330	U	330	U		
-Nitroaniline	910 U	830 (		830	U	830	U	•	
,6-Dinitro-2-methylphenol	910 U	830 (		830		830	U		
N-Nitrosodiphenylamine (1)		330 8	J	330	U	330	U		
-Bromophenyl-phenylether		330 1	J	330	U	330	U		
lexachlorobenzene			J	330	U	330	υ		
Pentachlorophenol	910 U	830 1	J	830	U	43	8		
Phenanthrene		330 1	J	330	U	330	U		
Anthracene		330 1	J	330	Ū	330	υ		
Carbazole		330 1	J	330	Ū	330	Ū		
Di-n-butylphthalate	(LLC 27 COBI)	1.1.0 89.1.1	ms U	19	J	330	ប		
Pluoranthene	360 U	(4 60 89)	j		U	330	บ		
Pyrene	360 U	330		330		78	ş.		
Butylbenzylphthalate		330	J	330		330	Ū		
3,3'-Dichlorobenzidine	360 U	330		330		330	Ū		
Benzo(a)anthracene		330		330		330	Ü		
Chrysene	360 U	330	J	330		330	Ū		
ois(2-Ethylhexyl)phthalate	( CBA JEB U	(,60 97/	ж ()	250		60	JВ		
Di-n-octyl phthalate	CLO RATES	330	ij	330		330	=		
Benzo(b)fluoranthene		330		330		330			
Renzo(k) fluoranthene	360 U	330		330		330			
Benzo(k)fluorantheneBenzo(a)pyrene	360 U	330		330		330			
Indeno(1,2,3-cd)pyrene		330		330		330			
Dibenz (a, h) anthracene		330		330		330			
Benzo(g,h,i)perylene	360 U	330		330		330			

- 3/12/cs

# Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



### Case Narrative

Client: TNU HANFORD B04-002

LVL#: 0501L688

SDG/SAF#: H2998/B04-002

**W.O.**#: 11343-606-001-9999-00 **Date Received:** 01-27-2005

### SEMIVOLATILE

Six (6) soil samples were collected on 01-25-2005.

The samples and their associated QC samples were extracted according to Lionville Laboratory SOPs based on SW 846 method 3540C on 02-02-2005 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 02-04-2005.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- All results presented in this report are derived from samples that met LvLI's sample acceptance 1. policy.
- 2. Samples were extracted and analyzed within required holding time.
- 3. Non-target compounds were detected in the samples.
- 4. All surrogate recoveries were within acceptance criteria.
- 5. All matrix spike recoveries were within acceptance criteria.
- All blank spike recoveries were within acceptance criteria. 6.
- The method blank contained the common laboratory contaminants Bis (2-Ethylhexyl) phthalate and 7. Di-n-butylphthalate at levels less than the CRQL.
- 8. Internal standard area and retention time criteria were met.
- Manual integrations are performed according to SOP QA-125 to produce quality data with the 9. utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").
- I certify, that this sample data package is in compliance with SOW requirements, both technically 10. and for completeness, other than the conditions detailed above. Release of the data, contained in this hard-copy data package, has been authorized, by the Laboratory Manager or a designee, as verified by the following signature.

Laboratory Manager

Lionville Laboratory Incorporated

Date

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som\gorup\data\bna\mu-hanford\0501-688.doc The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 2 0 pages. 00000002

Bechtel Hanfor	d Inc.	CH	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST B04-002-027 Page 1 o						of <u>2</u>				
Collector Doug Bowers			nv Contact Bowers	Telephon 531-07				Project Coordii KESSNER, JH	ator P	rice Code	Many	Data Tur	naround
Project Designation 100 BC Burial Grounds - Soil	Fuil Protocol		ng Location B-16-100 BC				_	SAF No. B04-002	A	ir Quality	<u> </u>	1 day	/)
ice Chest No. ERC 9	6069		ogbook No. 1173-3		COA R	10B/4 16	04	Method of Ship FED EX	ment	•		· (+	
Shipped To EBERLINE SERVICES (For	merly TMA LVL	Offsite	Pronerty No.	050		1-21-	97	Bill of Lading/	Air Bill No	` ਹ <i>ਦ</i> ਵ	مری	C	
POSSIBLE SAMPLE HAZA	RDS/REMARKS	i	Preservation	None	Cool 4C	Cool 4C		. '					
Special Handling and/or S	torage	İ	Type of Container	aG	aG	a.G				<del> </del>			
Obcess Handing and D	itoi age		No. of Container(s)	ì	1	1.							
Volume 250mL					60mL	120mL							
S** s				See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)	!						
Sample No.	Matrix *	Sample Date	Sample Time				134	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1			v ana a		
J02FL8	SOIL	-25-09	1240	χ	Y	X							
J02FL9	SOIL		123/	X	X	X							
J02FM0	SOIL		1310	X	X		• •		<u> </u>		<u> </u>		
J02FM1	SOIL		1332	X	X	X			<u> </u>				<u> </u>
J02FM2	SOIL	V	1240	l ×	×	<u> </u> '\rangle					<u>]</u>	<u> </u>	<u> </u>
Relinquished By/Removed From Relinquished By/Removed From Relinquished By/Removed From REFEC 3728	Date/Time  Date/Time  Date/Time	Sign/Prin Received By/Sto Received By/Sto SJGALS Received By/Sto	ed in D 3728 1.25.5 red in D 260	ate/Time	Sam (1) Mer	CIAL INSTR ples are from a n ICP Metals - 601 reury - 7470 - (C	on-rad s OTR (C		Barium, Cad	lmium, Chroanius	n, Lead, Selen	úun, Silver) ;	Matrix * S-Soil SE-Scolment SO-Soile SI-Shings W - Water O-OB A-Air
SJ GALESSON	12605 1000	FED	EX										DS=Orom Solids DL=Orom Liquids T=Tissue
Relinguished By/Removed From	72.7 05 1500	Received By/Sto		rate/Time 1510	P <sub>1</sub>	ersonnel not a	vailahl	e lo					Wi-Wipe L-Liquid \'=Vegetation
Relinquished By/Removed From	Date/Time	Received By/Syd	ryki In D	late/Time	. Le	elinquish samp ef# <u>2C</u> on_	les fro	m 3728				•	X=Qshor
Relinquished By/Removed From	Date/Time	Received By/Sto	red in C	ate/Time									
LABORATORY Received B	y			'n	itle							Date/Time	
FINAL SAMPLE Disposal M DISPOSITION	lethod	<del></del>			· · · · · · · · · · · · · · · · · · ·	Dispo	sed By		··			Date/Time	

Bechtel Hanfor	d Inc.	CI	CHAIN OF CUSTODY/SAMPI					/616	DECHEST			-002-027	Page 2	of 2
Collector Doug Bowers		Compa	inv Contact g Bowers	Telepho 531-0	nc No.		AINAL	313	Project Coordin KESSNER, JH	afor	Price Code			rnaround
Project Designation 100 BC Burial Grounds - Soil	Full Protocol		ing Location -B-16 100 BC						SAF No. B04-002		Air Quality	<u>-</u> <u>-</u> .	21 de	.45
ice Chest No.	6 069		Logbook No. . 1173-3		CO/	ARIO OBIJA	B16 260	0	Method of Shine FED EX	nent	-		•	
Shinned To EBERLINE SERVICES (For	merly TMA LVLI	Offsite	Property No.	650	0	83			Bill of Lading/A	Air Bill N	° 566	- 05	<u>'</u>	
POSSIBLE SAMPLE HAZA	RDS/REMARKS		Preservation	None	Con	ol 4C	Cool 4C							
Special Handling and/or S	torage		Type of Container	аG	-	aG aG	≱G					<u> </u>	<b> </b>	
Obecier standing and/or o				1		1	1 1							
	Volume	250mL	60	DinL	120mL									
<u> </u>					PCBs	s - 8082	Semi-VOA - 8270A (TCL)							
Sample No.	Matrix *	Sample Date	Sample Time	1 21										
J02FM3	SOIL	-15-0	5 1277	X	1	<u>X</u>	X					ļ	ļ	
		<u> </u>		<del> </del>	+-		<u> </u>				<del>-                                    </del>		<del> </del>	<del> </del>
				<del>                                     </del>	十			_			<del> </del>	<del>                                     </del>	<del>                                     </del>	<del> </del>
				<del>                                     </del>	1									<u> </u>
Relinquished By/Rethoved From FLAE X Relinquished By/Rethoved From Relinquished By/Rethoved From	Date/Time  Date/Time    149   Date/Time    140   Date/Time    150   Date/Time    150   Date/Time    150   Date/Time    150   Date/Time	Received By/Sto S-1 GAC  Received By/Sto F-E-D  Received By/Sto	red in D  red in D  E   S   -25 - 05    Fed in D  red in D	Date/Time  OS / S Date/Time	5/0	Samp (1) 10 Merci	CIAL INSTR les are from a s CP Metals - 60 ury - 7470 - (C rsonnel not s clinquish sam of # 2C on_	ion-rad s iotr (C CV)	site. Tient List) (Arsenic, E  Je to om 3728	3ariนm, CB	dmium, Chromiu			Matrix *  S-Soil SE-Scoliment SO-Soilat Si-Studge W = Water O-Out A-Air DS-Orrum Soilds DL-Drum Liquids T-Tissue WI-Wipe L-Liquid V-V-y-Station N-Other
LABORATORY Received By SECTION	,	Title				Title Da				Date/Time				
FINAL SAMPLE Disposal Mo DISPOSITION	eihod						Dispo	sed By				<u> </u>	Date/Time	

# Appendix 5

**Data Validation Supporting Documentation** 

VALIDATION LEVEL:	A	В	(0)	D	Е
PROJECT: 10	OBC 100	-B -16	DATA PACKAG	E: 42991	8
VALIDATOR:	TLI	LAB: LL	$\Gamma$	DATE: 3/1	1/05
			SDG:	# 2998	
		ANALYSES I	PERFORMED		
SW-846 8260		SW-846 8260 (TCLP)	W-846 8270	)	SW-846 8270 (TCLP)
SAMPLES/MAT	RIX				·- <u> </u>
JO2FL	8 702	FL9 ]	O2FMO	J02 FM	. (
JU2FM		F43			
					<u></u>
					Soil
DATA PA Technical verification Comments:	on documentation p		ASE NARRATIV		$\sim$
Technical verification	on documentation p				$\sim$
Technical verification	on documentation p				$\sim$
Technical verification	on documentation p	resent?			$\sim$
Technical verification	on documentation p	resent?	N (Levels D and E	(2)	Yes (No) N/A
Technical verification  Comments:  2. INSTRUM	IENT TUNING A	ND CALIBRATIO	N (Levels D and E		Yes No N/A
Technical verification  Comments:  2. INSTRUM  GC/MS tuning/perfe	IENT TUNING Allormance check acce	ND CALIBRATIO	N (Levels D and E	5)	Yes No N/A
Technical verification  Comments:  INSTRUM  GC/MS tuning/perform  Initial calibrations a	IENT TUNING Allormance check acce	ND CALIBRATIO	N (Levels D and E	(2)	Yes No N/AYes No N/AYes No N/A
Technical verification  Comments:  INSTRUM  GC/MS tuning/perfor  Initial calibrations a  Continuing calibrati	IENT TUNING All ormance check acce cceptable?	ND CALIBRATIO	N (Levels D and E	2)	Yes No N/AYes No N/AYes No N/AYes No N/AYes No N/A
Technical verification  Comments:  INSTRUM  GC/MS tuning/perform  Initial calibrations a  Continuing calibration  Standards traceable	IENT TUNING Allormance check acce	ND CALIBRATIO	N (Levels D and E		Yes No N/AYes No N/AYes No N/AYes No N/AYes No N/AYes No N/A

3. BLANKS (Levels B, C, D, and E)		
Calibration blanks analyzed? (Levels D, E)	No	(N/A
Calibration blank results acceptable? (Levels D, E)	No(	N/A
Laboratory blanks analyzed?	No	N/A
Laboratory blank results acceptable?Yes	(No	N/A
Field/trip blanks analyzed? (Levels C, D, E)	\No	N/A
Field/trip blank results acceptable? (Levels C, D, E)	No	N/A
Transcription/calculation errors? (Levels D, E)	No	N/A
Comments: dinbury phtheless - U at CNDC  bis (2001) hery) phtheless - U at CRDC		
FK - diesly photolate, di-n-buty photolet, bus(2-es	<u> </u>	heky
4. ACCURACY (Levels C, D, and E)		
Surrogates/system monitoring compounds analyzed?	No	N/A
Surrogate/system monitoring compound recoveries acceptable?	No	N/A
Surrogates traceable? (Levels D, E)	No(	N/A
Surrogates expired? (Levels D, E)	No(	N/A
MS/MSD samples analyzed?Yes	No `	N/A
MS/MSD results acceptable?Yes	No	N/A
MS/MSD standards NIST traceable? (Levels D, E) Yes	No(	N/A
MS/MSD standards? (Levels D, E)	No (	N/A)
LCS/BSS samples analyzed?	No	N/A
LCS/BSS results acceptable?	No	N/A
Standards traceable? (Levels D, E)	No(	N/A
Standards expired? (Levels D, E)	No (	N/A
Transcription/calculation errors? (Levels D, E)	Νo	WA
Performance audit sample(s) analyzed?Yes (	N)	N/A
Performance audit sample results acceptable?Yes	No (	N/A
Comments:		
		<del></del>

5.	PRECISION (Levels C, D, and E)			
MS/N	MSD samples analyzed?	Yes	No	N/A
MS/N	MSD RPD values acceptable?	Yes)	No	N/A
MS/N	MSD standards NIST traceable? (Levels D, E)	Yes	No	(N/A)
MS/N	MSD standards expired? (Levels D, E)	Yes	No	N/A
Field	duplicate RPD values acceptable?		No	N/A
	split RPD values acceptable?			
Trans	scription/calculation errors? (Levels D, E)	Yes	No	MA
Comi	ments:			$\stackrel{\smile}{-}$
6.	SYSTEM PERFORMANCE (Levels D and E)			^
	nal standards analyzed?	Yes	No/	/N/A
	rnal standard areas acceptable?		- 11	1 1
	nal standard retention times acceptable?		v	
	dards traceable?		- 1	
-	dards expired?		- 1	
	scription/calculation errors?			,
	ments:	•		$\frac{\vee}{}$
7.	HOLDING TIMES (all levels )			
Samp	oles properly preserved?	Yes	)No	N/A
Samp	ole holding times acceptable?	Yes	No	N/A
Com	ments:	$\overline{}$		

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTI	ON LIMITS (all		
levels)			
Compound identification acceptable? (Levels D, E)	Yes	Nd	N/A
Compound quantitation acceptable? (Levels D, E)	Yes	No	N/A
Results reported for all requested analyses?		No	N/A
Results supported in the raw data? (Levels D, E)	Yes	No(	NA
Samples properly prepared? (Levels D, E)	Yes	No(	NA
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes	No	N/A
Detection limits meet RDL?			
Transcription/calculation errors? (Levels D, E)		No	N/A
9. SAMPLE CLEANUP (Levels D and E)  GPC cleanup performed?	Yes	No	
GPC check performed?			, ,
GPC check recoveries acceptable?		- 1	
GPC calibration performed?			
GPC calibration check performed?			1 l
GPC calibration check retention times acceptable?		1	1 1
Check/calibration materials traceable?			1
Check/calibration materials Expired?		- 1	(
Analytical batch QC given similar cleanup?	Yes	No	N/A
Transcription/Calculation Errors?			1 1
Comments:			$\underline{\vee}$
<del></del>			

Date: 14 March 2005

To: Bechtel Hanford Inc. (technical representative)

From: TechLaw, Inc.

Project: 100 BC Burial Grounds - Soil Full Protocol - Waste Site 100-B-16

Subject: PCB - Data Package No. H2998-LLI (SDG No. H2998)

### INTRODUCTION

This memo presents the results of data validation on Data Package No. H2998-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
JO2FL8	1/25/05	Soil	С	See note 1
JO2FL9	1/25/05	Soil	С	See note 1
J02FM0	1/25/05	Soil	С	See note 1
J02FM1	1/25/05	Soil	С	See note 1
J02FM2	1/25/05	Soil	С	See note 1
J02FM3	1/25/05	Soil	С	See note 1

<sup>1 -</sup> PCBs by 8082.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, December 2001). Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

### **DATA QUALITY OBJECTIVES**

### Holding Times

Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

### Method Blank

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than required quantitation limit (RQL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than RQL, the result is qualified as undetected and elevated to the RQL.

All method blank target compound results were acceptable.

### Field Blanks

One field blank (J02FM3) was submitted for analysis. No analytes were detected in the field blank.

#### Accuracy

### Matrix Spike & Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All accuracy spike results were acceptable.

### Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Non-detected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Non-detected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate results were acceptable.

#### Precision

### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All matrix spike/matrix spike duplicate results were acceptable.

### Field Duplicate Samples

One set of field duplicates (J02FM1/J02FM2) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

### Analytical Detection Levels

Reported analytical detection levels are compared against the Remaining Waste Sites RQLs to ensure that laboratory detection levels meet the required criteria. All analytes met the RQL.

### Completeness

Data Package No. H2998-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

### MAJOR DEFICIENCIES

None found.

### MINOR DEFICIENCIES

None found.

### REFERENCES

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 3, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, December 2001.

# Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.

  The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

### PCB DATA QUALIFICATION SUMMARY\*

SDG: H2998	REVIEWER: TLI	DATE: 3/14/05	PAGE 1 OF 1		
COMMENTS: No qualifiers	assigned				

<sup>\* -</sup> The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

# Appendix 3

**Qualified Data Summary and Annotated Laboratory Reports** 

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C.	_
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Project: BECHTEL-HANFORD													
Laboratory: Lionvill	e Laborato	ry Inc.		}									
Case:	se: SDG: H2998		]										
Sample Number	ber J02FL8		J02FL9		J02FM0		J02FM1		J02FM2		J02FM3		
Remarks										Duplicate	}	E. Blank	
Sample Date		1/25/05 1/25/		1/25/05		1/25/05		1/25/05		1/25/05		1/25/05	
Extraction Date		2/4/05		2/4/05 2/4		2/4/05	2/4/05 2/4/05			2/4/05		2/4/05	
Analysis Date		2/8/05		2/8/05		2/8/05		2/8/05		2/9/05		2/9/05	
PCB	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016	20	15	U	15	υ	14	U	16	U	15	U	13	U
Aroclor-1221	20	15	U	15	U	14	U	16	υ	15	U	13	U
Aroclor-1232	20	15	Ū	15	Ū	14	U	16	Ü	15	Ū	13	Ü
Aroclor-1242	20	15	U	15	U	14	U	16	U	15	U	13	υ
Aroclor-1248	20	15	U	15	U	14	Ju	16	U	15	U	13	Ū
Aroclor-1254	20	15	Ū	15	Ū	14	U	16	U	15	U	13	U
Aroclor-1260	20	15	U	15	Ū	24		16	U	15	U	13	U

### Lionville Laboratory, Inc.

PCBs by GC

Report Date: 02/09/05 09:47 RFW Batch Number: 0501L688 Client: TNUHANFORD B04-002 H2998 Work Order: 11343606001 Page: 1

	Cust ID:	J02FL8	J02FL9	)	J02FMC	)	J02FM0	l	J02FM0	)	J02FM	1
Sample RFW#:		001	001 002		003		003 MS		003 MSD		004	
Information	Matrix:	SOIL	SOIL		SOIL		SOIL		SOIL		SOIL	
	D.F.:	1.00	1.0	0	1.0	00	1.0	0	1.0	0	1.0	
	Units:	UG/KG	UG/K	UG/KG		UG/KG		G	UG/KG		UG/KG	
Surrogate:	Tetrachloro-m-xylene	82 %	82	8	74	*	85	*	84	*	79	
	Decachlorobiphenyl	90 🕏	86	*	80	ક	90	¥	88	*	86	*
EBEEEEEE		fl	========	=fl==		=fl==	.=======	=fl=:		=fl==		==f1
Aroclor-1016	6	15 U	15	U	14	ט	84	왐	80	¥	16	U
Aroclor-1221	1	15 U	15	U	14	U	14	U	14	ט	16	-
Aroclor-1232	2	15 U	15	U	14	ט	14	U	14	U	16	-
Aroclor-1242	2	15 U	15	Ū	14	ט	14	Ū	14	ט	16	_
Aroclor-1248	8	15 ປ	15	υ	14	U	14	U	14	U	16	_
Aroclor-1254	4	15 ປັ	15	U	. 14	U	14	Ū	14	Ū	16	_
Aroclor-1260	0	15 U	15	Ü	24		84	ŧ	78	8	16	Ü

	Cust ID:	J02FM	2	J02FM3	3	PBLKFT		PBLKFT BS		
Sample Information	RFW#: Matrix: D.F.: Units:	005 SOIL 1.00 UG/KG		006 SOIL 1.00 UG/KG		05LE0091-MB1 SOIL 1.00 UG/KG		SOIL 1.00 UG/KG		3/12/05
Surrogate:	Tetrachloro-m-xylene Decachlorobiphenyl	76 82	*	80 85	ક	78 82	<b>8</b>	82 90	* *	<u> </u>
Aroclor-1016	======================================	 15	==11== U	13	==£l U		=fl U	.======== 75	≖fl %	=========fl
Aroclor-1221		15	-	13	_	· <u>-</u>	Ü	13	Ü	
Aroclor-1232		15	_	13	U	13	Ū	13	Ū	
Aroclor-1242 Aroclor-1248		15		13	Ü	13	Ü	13	U	
Aroclor-1254		15 15		13 13	U U	13 13	U U	13 13	U	
Aroclor-1260		15		13	Ū	13	Ü	83	ક	

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC.

Laboratory Narrative and Chain-of-Custody Documentation



#### Case Narrative

Client: TNU HANFORD B04-002

LVL#: 0501L688

SDG/SAF#: H2998/B04-002

W.O.#: 11343-606-001-9999-00 **Date Received:** 01-27-2005

#### **PCB**

Six (6) soil samples were collected on 01-25-2005.

The samples and their associated QC samples were extracted on 02-04-2005 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 02-08,09-2005. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- All results presented in this report are derived from samples that met LvLI's sample acceptance 1. policy.
- 2. Samples were extracted and analyzed within required holding time.
- The samples and their associated QC samples received Copper-Sulfur and Sulfuric Acid cleanups 3. according to Lionville Laboratory SOPs based on SW846 methods 3660A and 3665A respectively.
- The method blank was below the reporting limits for all target compounds. 4.
- All surrogate recoveries were within acceptance criteria. 5.
- 6. The blank spike recoveries were within acceptance criteria.
- All matrix spike recoveries were within acceptance criteria. 7.
- All initial calibrations associated with this data set were within acceptance criteria. 8.
- 9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
- I certify that this sample data package is in compliance with SOW requirements, both technically 10. and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

aboratory Manager

Lionville Laboratory Incorporated

000013

som\r:\group\data\pest\tnu hanford\0501-688.pcb

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 8 pages. 0000002

Bechtel H	lanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST							B04-002-027 Page 1 of 2				
Collector Doug Bowers			nny Contact g Bowers	Telephor 531-07				Project Coordi KESSNER, JH	nator p	rice Code	Many	Data Tur	naround
Project Designation 100 BC Burial Groun	nds - Soil Full Protocol		ing Location -B-16 100 BC					SAF No. B04-002	A	ir Quality	<u> </u>	1 day	/]
Ice Chest No. ER	C 96 069		Logbook No . 1173-3		COA R	108/4 16		Method of Shin FED EX	ment			t	
Shipped To EBERLINE SERVICE	CES (Formerly TMA) LVL	Offsite	Property No.	050	083	/-21	-01	Bill of Lading/	Air Bill No	હ <i>ન્</i> ટ	<u> مړی -</u>	ے	
POSSIBLE SAMPLE	HAZARDS/REMARKS				ľ		İ		l		l '`		
•		•	Preservation	None	Cool 4C	Cool 4C			,				
Special Handling a	nd/or Storage		Type of Container	aG	aG	aG			ļ				
			No. of Container(s)	250mL	60ınL	120mL		-			<u> </u>		
	•		Volume			120002			ĺ				
000014	SAMPLE ANAL	.YSIS		See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)							
4.	· ·								l	_			
Sample No.	Matrix *	Sample Date	Sample Time		40.12	<b>全</b>	3 (2)	ZA PAUM	V-12		10.70		133, \$2
J02FL8	SOIL	1-25-09	1240	χ	Υ	X							
J02FL9	SOIL	1	1.23/	Υ	X	У		. <u>-</u> .	<u>.</u>				
J02FM0	SOIL		1210	X	X_	X							
J02FM1	SOIL		1332	X	X	X							
J02FM2	SOIL	>	1240	×	×	X							
CHAIN OF POS	SSESSION	Sign/Prin				CIAL INSTR							Matrix *
Relinquished By/Removed	From Date/Time 728/2605 /000 From Date/Time 728/2605 /000 From Date/Time	Received By/Sto SJGA-La Received By/Sto	red In D 1260  red In 1260  red In D 1260	ate/Time	5 (1) Mer	ples are from a i ICP Metals - 60 cury - 7470 - (0	IOTR (C	site. Client List) (Arsenic.	Bariun, Cad	lmium. Chromiu	n, Lead, Sclen	iun, Silver);	S=Sell SE=Scatiment SO=Solid SI=Shadge W = Water O=Oll A=Alr DS=Draws Solids
Relinguished By/Removed FCAEX Relinguished By/Removed	From #7/2-7   Pare/Time   1500	Received By/Sta	wed in 1/27/05	Pate/Time 1510 Date/Time	·   r	ersonnel not a elinquish sam ef # <u>2C</u> on	oles fro	om 3728			÷		DL=Orom Liquids T=Tissue Wl=Wipe L=Liquid V=Vegenatou N=Other
Relinquished By/Removed	From Date/Time	Received By/Sto	ored In C	Date/Time				<u>-                                    </u>					
LABORATORY R SECTION	Leceived By			7	itle							Date/Time	
FINAL SAMPLE DISPOSITION	Disposal Method				•	Disp	osed By					Date/Time	

Contents Control Toleshook No. Dong Bower S114701	Bechtel	Hanford	Inc.	_C	HAIN OF CUST	TODY/S	AMP	LE A	NALY	SIS	REC	OUEST	r	B04	-002-027	Page 2	of <u>2</u>
Record By-Sample No.   Matrix   Sample Date   Sample Time   Sample No.   Matrix   Sample Date   Sample Time   Sample No.   Matrix   Sample Date   Sample Time   Sample No.   Matrix   Sample Date   Sample Time   Matrix   Sample Date   Matrix   Sample Date   Matrix   Sample Date   Matrix   Matrix   Sample Date   Matrix										-			nator	Price Code	Many	Data Tu	rnaround
Section   State   Section   State   Section		ounds - Soil F	Full Protocol										A	ir Quality	<u> </u>	21 de	45
Preservation None Container   Special Handling and/or Storage   Type of Container   Special Handling and/or Storage   Type of Container   Special Handling and/or Storage   Spec	ice Chest No.	C 96	. 069				COA RIQOB	113600 113600	62600	3	FEI	DEX				•	
Special Handling and/or Storage  Type of Container   0	EBERLINE SERV	/ICES (Form	erly TMA LVL	Offsite	e Pronerty No.	2050	08	3			Bill o	f Lading/	Air Bill No	See	- 057	<u>`</u>	
Special Handling and/or Storage  Type of Container of S of S of S of S of S of S of S of	POSSIBLE SAMP	LE HAZAR	DS/REMARKS														•
Service   Type of Container(s)					Preservation		<u> </u>										<u> </u>
Sample No. Matrix * Sample Date Sample Time Seed of Sample Time Seed of Sample Time Seed of Sample Time Seed of Sample Seed of Sample Time Seed of Sample Time Seed of Sample Time Seed of Sample Time Seed of Sample Seed of Sample Time Seed of Sample Seed of Sample Time Seed of Sample Time Seed of Sample Seed of Samp	Special Handling and/or Storage			Type of Container	<b>↓</b>	—		<b></b> -↓		_				<u> </u>	<u> </u>		
SAMPLE ANALYSIS  Sample No. Matrix * Sample Date Sample Time  Sample No. Matrix * Sample Date Sample Time  JO2FM3  SOIL 1-2-05 1A77  CHAIN OF POSSESSION  Sign/Print Names  Relinquisted gy/Removed From Date * p3			•		No. of Container(s)									ļ	<u> </u>	<del>                                     </del>	
Sample No. Matrix * Sample Date Sample Time  JOZFM3 SOIL					Volume	130,	""	֓֟֓֞֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓									1
Sample No. Matrix * Sample Date Sample Time  JOZFM3 SOIL	0001		SAMPLE ANAL	YSIS		Special	PCBs - 8										
SOIL   15 - 05   1377   X   X   X   X   X   X   X   X   X			Matrix •	Sample Date	Sample Time	10 Tel 10	1	5 km (2 1)		- 1		• .		<del>                                     </del>	्रम् तरमन्त्र प्रमा <b>टक</b>	Callette Grand	Paragraphic de Salada
CHAIN OF POSSESSION  Sign/Print Names  Relinquished By/Removed From 10 aver 7) - 25 - 45   1000    Relinquished By/Removed From Date/Time  PEF 3728 2C   165   1000    Received By/Stored In   Date/Time    Sign/Print Names  Received By/Stored In   Date/Time    Received By/Stored In   Date/Time    SPECIAL INSTRUCTIONS  Samples are from a non-rad site.  (1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver);  Wereury - 7470 - (CV)  Received By/Stored In   Date/Time    SPECIAL INSTRUCTIONS  Samples are from a non-rad site.  (1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver);  Wereury - 7470 - (CV)  Received By/Stored In   Date/Time    Personnet not available to relinquish samples from 3728  Relinquished By/Removed From   Date/Time   Received By/Stored In   Date/Time    Relinquished By/Removed From   Date/Time    Received By/Stored In   Date/Time    Received By/Stored In   Date/Time    Personnet not available to relinquish samples from 3728  Ref # 2C on 1 / 26 / 9 5  Date/Time    Dat		<u>-                                      </u>		· · · · ·		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		-1, 14 E.V.	1/	<u> 1</u> 17	<u> </u>	<u> </u>	41 75			A. 1. 1985	
Recirculation of the properties of the propertie				1-45-10	5 191/-	<del> </del>	<del>  /</del>	<del>-    /</del>	<del>Z  </del> -			<del></del>	<b>}</b>	<del> </del>	<u> </u>	┼	<del> </del>
Recirculation of the properties of the propertie						-	┼		┵							<del> </del>	
Recirculation of the properties of the propertie				<del> </del>	<del></del>	<del>  -</del> -	<del> </del>				-	-	<del> </del>		<u> </u>	<del> </del>	<u> </u>
Recirculation of the properties of the propertie				<del></del>	<u> </u>	<del>                                     </del>	┼─									<del> </del>	<u> </u>
Recirculation of the properties of the propertie	CHAIN OF PO	SSESSION	<del> L</del>	Sign/Prin	l Names	<u> </u>	l Ter	DECLA	DICTOL				<u> </u>	<u> </u>	<u> </u>	<u></u>	
Relinquished By/Removed From Date/Time Received By/Stored In Date/Time Personnel not available to relinquish samples from 3728 Relinquished By/Removed From Date/Time Received By/Stored In Date/Time  LABORATORY SECTION  Title  Disposed By  Disposed By  Date/Time  Disposed By  Disposed By  Date/Time  Disposed By  Date/Time	Relinquished By/Remove REF 3725 Relinquished By/Remove SJGALEJAX	Dewer	Date/Time  / 860 5 / 000	Received By/Stor Received By/Stor Substitute By/Stor Received By/Stor	ed In	/600 ate/Time 05 /00 ate/Time	s	iamples are	: from a no: :tals - 6010	n-rad si )TR (Cl	ite.	(Arsenic,	Barium, Cada	nium, Chromiu	n, Lead, Selen	ium. Silver);	S=Soli SE=Sodimens SO=Solid SI=Sindge W = Wister O=Oli A=Air DS=Drum Solids
Relinquished By/Removed From Date/Time Received By/Stored In Date/Time relinquish samples from 3728 Relinquished By/Removed From Date/Time Received By/Stored In Date/Time  Title Disposed By  Disposed By  Date/Time  Disposed By  Date/Time	FEREX	1/2	7/05 1510	SPL	my 1/27/	05 15	70	Personn	el not av	eldelie:	e to		•				W3=W3pc L-Liquid
Relinquished By/Removed From Date/Time Received By/Stored In Date/Time  LABORATORY SECTION Title Disposal Method  Disposal Method  Date/Time  Date/Time	Reinquished By/Remove	ed From	Date/Time	Received By/Stor	red In D	ate/Time		relingu	ish sampl	les troi	m 3728						X=Other
SECTION  FINAL SAMPLE Disposal Method  Disposed By  Date/Time	Relinquished By/Remove	ed From	Date/Time	Received By/Stor	red in D	ate/Time		Kei # C	<u>C</u> On <u>/</u>	_/_64	<u> </u>	•	•				ŧ
		Received By		· · · · · · · · · · · · · · · · · · ·		Ti	itle					•				Date/Time	<del></del>
		Disposal Meth	ood	· <del></del>			· ·		Dispose	d By		<u></u>		<del></del>	<del></del> ,	Date/Time	

**Data Validation Supporting Documentation** 

VALIDATION LEVEL:	A	В	C	D	E
PROJECT: / O	OBC 100	-B-14	DATA PACKAG	E: H299	8
VALIDATOR:	7LT	LAB: LLI		DATE: 3/16	105
	-		SDG: H	2998	
		ANALYSES I	PERFORMED	<u>.</u>	
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		
SAMPLES/MATI	ux			; w <u>s</u>	
JU2FL8	J024	L9 JU21	FMO JO	2F41	
JU2FMZ	JU2FA	13			
					501
DATA PA Technical verification Comments:			CASE NARRATIV		Yes No N/A
Initial calibrations a Continuing calibrati Standards traceable Standards expired? Calculation check ac DDT and endrin bre	cceptable?	e?			Yes No N/AYes No N/AYes No N/AYes No N/A
Comments:					

3. BLANKS (Levels B, C, D, and E)			
Calibration blanks analyzed? (Levels D, E)	Yes	No	N/A
Calibration blank results acceptable? (Levels D, E)	Y <u>e</u> s	No⁄	XXX
Laboratory blanks analyzed?			
Laboratory blank results acceptable?	Yes	No	N/A
Field/trip blanks analyzed? (Levels C, D, E)			
Field/trip blank results acceptable? (Levels C, D, E)	(Feg.)	A CO	To
Transcription/calculation errors? (Levels D, E)	_	<b>~</b> L	
Comments:			_
4. ACCURACY (Levels C, D, and E)		,	
Surrogates analyzed?	$\sim$		
Surrogate recoveries acceptable?			
Surrogates traceable? (Levels D, E)		,	<b>\</b> ~
Surrogates expired? (Levels D, E)	_		
MS/MSD samples analyzed?	· /		
MS/MSD results acceptable?	Yès	No	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	N/A
MS/MSD standards expired? (Levels D, E)			
LCS/BSS samples analyzed?	. Fas	No	N/A
LCS/BSS results acceptable?	Yes	No	N/A
Standards traceable? (Levels D, E)	Yes	No	N/A
Standards expired? (Levels D, E)	Yes	No	MA
Transcription/calculation errors? (Levels D, E)	Yes	No/	N/A
Performance audit sample(s) analyzed?			
Performance audit sample results acceptable?			-
Comments:		_ (	
	-		

5. PRECISION (Levels C, D, and E)	$\sim$
Duplicate RPD values acceptable?	(Yes No N/A
Duplicate results acceptable?	
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A
MS/MSD standards expired? (Levels D, E)	Yes No N/A
Field duplicate RPD values acceptable?	<i>-</i> 1
Field split RPD values acceptable?	
Transcription/calculation errors? (Levels D, E)	
Comments:	
6. SYSTEM PERFORMANCE (Levels D and E)  Chromatographic performance acceptable?	Ves No N/A
Positive results resolved acceptably?	
Comments:	
· · · · · · · · · · · · · · · · · · ·	
7. HOLDING TIMES (all levels)	
Samples properly preserved?	
Sample holding times acceptable?	(Yes )No N/A
Comments:	

8. COMPOUND IDENTIFICATION, QUANTITATION, AN	ID DETECTION LIMITS (all
levels)	شر
Compound identification acceptable? (Levels D, E)	Yes No NA
Compound quantitation acceptable? (Levels D, E)	Yes No N/A
Results reported for all requested analyses?	
Results supported in the raw data? (Levels D, E)	
Samples properly prepared? (Levels D, E)	Yes No (N7.4)
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (NTA
Comments:	
9. SAMPLE CLEANUP (Levels D and E)	$\wedge$
Fluoricil ® (or other absorbent) cleanup performed?	
Lot check performed?	
Check recoveries acceptable?	
GPC cleanup performed?	Yes No N/A
GPC check performed?	
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/
Analytical batch QC given similar cleanup?	Yes No N//
Transcription/Calculation Errors?	<b>1</b>
Comments:	<u>V</u>

Date:

14 March 2005

To:

Bechtel Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

100 BC Burial Grounds - Soil Full Protocol - Waste Site 100-B-16

Subject: Inorganics - Data Package No. H2998-LLI (SDG No. H2998)

#### INTRODUCTION

This memo presents the results of data validation on Data Package No. H2998-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
J02FL8	1/25/05	Soil	С	See note 1
J02FL9	1/25/05	Soil	С	See note 1
J02FM0	1/25/05	Soil	С	See note 1
J02FM1	1/25/05	Soil	С	See note 1
JO2FM2	1/25/05	Soil	С	See note 1
J02FM3	1/25/05	Soil	С	See note 1

<sup>1 -</sup> ICP metals (6010B) and mercury (7471A).

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, December 2001). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

### **DATA QUALITY PARAMETERS**

#### **Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 28 days for mercury and 6 months for ICP metals.

All holding times were acceptable.

### Preparation (Method) Blanks

#### Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

Due to method blank contamination, the chromium result in sample J02FM3 was qualified as an estimate and flagged "UJ".

All other preparation blank results were acceptable.

#### Field (Equipment) Blank

One field blank (J02FM3) was submitted for analysis. Barium, chromium and lead were detected in the equipment blank. Under the BHI statement of work, no qualification is required.

### Accuracy

#### Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data . The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are

qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a MS recovery of 39.5%, all barium results were qualified as estimates and flagged "J".

Due to an LCS recovery of 69%, all silver results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

#### Precision

### **Laboratory Duplicate Samples**

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD of 73.6%, all barium results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

### Field Duplicate

One set of field duplicate samples (J02FM1/J02FM2) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

### Analytical Detection Levels

Reported analytical detection levels are compared against the remaining waste sites RQLs to ensure that laboratory detection levels meet the required criteria. All reported results met the analyte specific RQL.

#### Completeness

Data package No. H2998-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

#### MINOR DEFICIENCIES

Due to method blank contamination, the chromium result in sample J02FM3 was qualified as an estimate and flagged "UJ". Due to a MS recovery of 39.5%, all barium results were qualified as estimates and flagged "J". Due to an LCS recovery of 69%, all silver results were qualified as estimates and flagged "J". Due to an RPD of 73.6%, all barium results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

#### **REFERENCES**

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 3, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, December 2001.

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

**Summary of Data Qualification** 

## **INORGANIC DATA QUALIFICATION SUMMARY\***

SDG: H2998	REVIEWER: TLI	DATE: 3/14/05	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Chromium	UJ	J02FM3	Blank contamination
Silver	J	All	LCS
Barium	J	All	RPD & MS

<sup>\* -</sup> The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

**Qualified Data Summary and Annotated Laboratory Reports** 

Project: BECHTEL	-HANFOR	D		]									
Laboratory: LLI		_											
Case	SDG: H2	998											
Sample Number		J02FL8		J02FL9		J02FM0		J02FM1		J02FM2		J02FM3	
Remarks										Duplicate		E. Blank	
Sample Date	_	1/25/05		1/25/05		1/25/05		1/25/05		1/25/05		1/25/05	
Inorganics	RQL	Result	Q	Result	a	Result	Q	Result	q	Result	Q	Result	Q
Silver	0.2	0.05	UJ	0.05	IJ	0.05	IJ	0.06	IJ	1.5	J	0.05	W
Arsenic		3.0		3.3		2.7		2.9		3.1	<u> </u>	0.28	_
Barium	20	226	J	177	J	71.7	J	83.0	5	108	J	58.2	J
Cadmium	0.2	0.23		0.36		0.23		0.26		0.27	<u> </u>	0.04	
Chromium	1	11.7		12.5		9.3		15.4		10.7		0.05	UJ
Mercury	0.2	0.02	υ	0.03		0.02	υ	0.01	U	0.02	U	0.01	U
Lead	5	8.1	<u> </u>	8.7		5.4		7.9		6.9	<u></u>	8.2	-
Selenium	1	0,42	U	0.41	U	0.41	U.	0.46	U	0.43	U	0.39	U

### INORGANICS DATA SUMMARY REPORT 02/10/05

CLIENT: TNUHANFORD B04-002 H2998 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0501L688

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
	***********			*****	*******	*******
-001	J02FL6	Silver, Total	0.05 ບູ່	MG/KG	0.05	1.0
		Arsenic, Total	3.0	MG/KG	0.30	1.0
		Barium, Total	226 J	MG/KG	0.02	1.0
		Cadmium, Total	0.23	MG/KG	0.04	1.0
		Chromium, Total	11.7	MG/KG	0.04	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
	•	Lead, Total	8.1	MG/KG	0.20	1.0
		Selenium, Total	0.42 น	MG/KG	0.42	1.0
-002	J02FL9	Silver, Total	0.05 u	√MG/KG	0.05	1.0
		Arsenic, Total	3.3	MG/KG	0.30	1.0
		Barium, Total	177 <b>T</b>	MG/KG	0.02	1.0
		Cadmium, Total	0.36	MG/KG	0.04	1.0
		Chromium, Total	12.5	MG/KG	0.04	1.0
		Mercury, Total	0.03	MG/KG	0.01	1.0
		Lead, Total	8.7	MG/KG	0.20	1.0
		Selenium, Total	0.41 u	MG/KG	0.41	1.0
-003	J02FM0	Silver, Total	0.05 u	Tmg/kg	0.05	1.0
		Arsenic, Total	2.7	MG/KG	0.30	1.0
		Barium, Total	71.7 🏅	MG/KG	0.02	1.0
		Cadmium, Total	0.23	MG/KG	0.04	1.0
		Chromium, Total	9.3	MG/KG	0.04	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	5.4	MG/KG	0.19	1.0
		Selenium, Total	0.41 u	MG/KG	0.41	1.0

3/12/05

### INORGANICS DATA SUMMARY REPORT 02/10/05

CLIENT: TNUHANFORD B04-002 H2998

LVL LOT #: 0501L688

WORK ORDER:	11343-606-001-9999-00
-------------	-----------------------

				REPORTING	DILUTION
SAMPLE	SITE ID	analyte	RBSULT UNITS	LIMIT	FACTOR
					*******
-004	J02 <b>PM1</b>	Silver, Total	0.06 u MG/KG	0.06	1.0
		Arsenic, Total	2.9 MG/KG	0.33	1.0
		Barium, Total	83.0 <b>3</b> MG/KG	0.02	1.0
		Cadmium, Total	0.26 MG/KG	0.05	1.0
		Chromium, Total	15.4 MG/KG	0.05	1.0
		Mercury, Total	. 0.01 u MG/KG	0.01	1.0
		Lead, Total	7.9 MG/KG	0.22	1.0
		Selenium, Total	0.46 u MG/KG	0.46	1.0
-005	J02FM2	Silver, Total	1.5 X MG/KG	0.05	1.0
		Arsenic, Total	3.1 MG/KG	0.31	1.0
		Barium, Total	108 🏅 MG/KG	0.02	1.0
		Cadmium, Total	0.27 MG/KG	0.04	1.0
		Chromium, Total	10.7 MG/KG	0.04	1.0
		Mercury, Total	0.02 u MG/KG	0.02	1.0
		Lead, Total	6.9 MG/KG	0.21	1.0
		Selenium, Total	0.43 u MG/KG	0.43	1.0
-006	J02FM3	Silver, Total	0.05 uJMG/KG	0.05	1.0
		Arsenic, Total	0.28 u_NG/KG	0.28	1.0
		Barium, Total	58.2 J MG/KG	0.02	1.0
		Cadmium, Total	0.04 u MG/KG		1.0
		Chromium, Total	0.05 <b>VJ</b> NG/KG	0.04	1.0
		Mercury, Total	0.01 u MG/KG	0.01	1.0
		Lead, Total	8.2 MG/KG	0.18	1.0
		Selenium, Total	0.39 u MG/KG	0.39	1.0

3/12/03

Laboratory Narrative and Chain-of-Custody Documentation



### **Analytical Report**

Client: TNU-HANFORD B04-002

LVL#: 0501L688

SDG/SAF#: H2998/B04-002

W.O.#: 11343-606-001-9999-00

Date Received: 01-27-05

#### METALS CASE NARRATIVE

1. This narrative covers the analyses of 6 soil samples.

- 2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.
- 3. All analyses were performed within the required holding times.
- 4. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
- 5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).
- 6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
- 7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.
- 8. All ICP Interference Check Standards were within control limits.
- 9. All laboratory control samples (LCS) were within the 80-120% control limits with the exception of Silver at 69.2%. Refer to the Inorganics Laboratory Control Standards Report.
- 10. The matrix spike (MS) recovery for 1 analyte was outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.
- 11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at meaningful concentration level for the following analytes:

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 17 pages.

		<u>PDS</u>	<u>PDS</u>
Sample ID	<b>Element</b>	Concentration (ppb)	% Recovery
J02FL8	Barium	300	104.4

- 12. The duplicate analysis for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
- 13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.
- 14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

ijw/m01-688

alolog



Bechtel Hanfor	d Inc.	CH	IAIN OF CUST	ODY/S.	<b>AMPLE</b>	ANALY	SIS	REC	<u>UEST</u>		B04-	002-027	Page 1 o	1 2
Collector Doug Bowers		Comna	Company Contact Telephone No. Doug Bowers 531-0701					RESSIVER, ST		Price Code Many Data Turna		around		
Project Designation 100 BC Burial Grounds - Soil	Fuli Protocol		Sampling Location 100-B-16 100 BC					SAF No. B04-002 Air Quality			21 day)			
lce Chest No. ERC 9	6069	3	.ogbook No. 1173-3		COA R	108/4 X 6			od of Shipm DEX	ent ·				
Shipped To EBERLINE SERVICES (For	(IVI)	Offsite	Property No.	050	083	1-21-	1	Bill o	f Lading/A	ir Bill No.	ડ હદ	<u> حری -</u>		
POSSIBLE SAMPLE HAZA	RDS/REMARKS			ļ ·	[			ļ		•			1	
•			Preservation	None	Cool 4C	Cool +C								
Special Handling and/or S	torage	i	Type of Container	aG	aG	aG		$\perp$						
Special Handring and o	.v. mP-		No. of Container(s)	1	1	1 120 1					. —			
00			Volume	250mL	60mL	120mL								
000016	SAMPLE ANALY	SIS		See item (1) in Special Instructions.	PCBs - 1082	Semi-VOA - #270A (TCL)								
. 07			· · · · · · · · · · · · · · · · · · ·	 <del> </del>		व राष्ट्र संचित्र हो।	16	39. PA 1	Decree 1	1 15 Ja 53	ECNA A		Mark Armelin (Mark	i Karace
Sample No.	Matrix *	Sample Date	Sample Time	4611	W. Y. S.	· 禁强(人)	3.00	San San S	Giologia ()		<b>等</b> 公司工作	製造が製造		和中国的
J02FL8	SOIL.	-25-04	1340	$\chi$	<del>  X</del>	1.8				-				_
J02FL9	SOIL		<u> </u>	X	<u> </u>	X.					ļ	ļ		
J02FM0	SOIL		1310	X	X	X_	<u> </u>		<u></u>		<u> </u>	ļ <del></del>	<u> </u>	
J02FM1	SOIL		1337	X	X	<u> </u>	<u> </u>			<u></u>	<del> </del>	<u> </u>	<u> </u>	
J02FM2	SOIL	V	1240	X	×	\ \	<u> </u>				<u> </u>	1	<u> </u>	Non-in A
CHAIN OF POSSESSIO		Sign/Pris				CIAL INSTR								Matrix *
Relinquished By/Removed From Date Time   Received By/Stored In   Date/Time   Received By/Stored In   D					ium, Silver};	S=Soli SE=Sedinum SO=Solid SI=Shudge W = Water O=Oli A=Air DS=Drum Solids DL=Drum Liquids								
Retinguished By/Removed From	72-1 05 1500 Date/Time	Received By/Sk Received By/Sk	ored in 1/27/05	Date/Time 1510 Date/Time		ersonnel not a	ples (n	om 372	8					T=Tissue Wi=Wipe L=Liquid V=Vegetation X=Other
Relinquished By/Removed From	Date/Time	Received By/Sn	<u> </u>	Date/Time	k	lef# <u>2C_</u> on_	112	6103	<u> </u>					
LABORATORY Received I	Ву	•			Title								Date/Time	
FINAL SAMPLE Disposal N DISPOSITION	Method					Disp	osed B	y	<del></del> "				Date/Time	

Bechtel :	Hanford Inc.	CI	IAIN OF CUST	ODY/S	AMPLI	E ANAL)	/SIS	REQUES	r	B04-	-002-027	Page 2	of <u>2</u>
Collector Doug Bowers			inv Contact g Bowers	Telenkor 531-07				Project Coord KESSNER, JH	inator	Price Code	Many	Data Tuz	naround
Project Designation 100 BC Burial Grou	unds - Soil Full Protocol		ing Location -B-16 100 BC					SAF No. B04-002		Air Quality		21 de	45
ice Chest No.	C 96 069		Logbook No. , 1173-3		COA R	10Bi6260	0	Method of Shirt			<u>.</u>	•	*
Shinned To EBERLINE SERV	ICES (Formerly TMA LVL)	Offsite	Property No.	050	083	<b>;</b>		Bill of Lading	/Air Bill N	o. SEE	700		<b>,</b>
POSSIBLE SAMPL	E HAZARDS/REMARKS										] .		
			Preservation	None	Cool +C	Cool+C							
Special Handling	and/or Storage		Type of Container	aG	aG	aG							
Opeciar			No. of Container(s)	1	1	1							
			Volume	250mL	60mL	120mL							
00001	SAMPLE ANALY	SIS		See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)							
Sample No.	. Matrix *	Sample Date	Sample Time	-								14.75 E	
J02FM3	SOIL	1-15-0	5 1437	У	X	X		~					
						'							
				<u> </u>					ļ		<u> </u>		
				<b> </b>					<u> </u>		ļ		
CHAIN OF BO	ACCECTION	Ct m .t	- N	<u> </u>	1				<u> </u>	<u></u>		<u> </u>	None in A
CHAIN OF PO		Sign/Prin		ate/Time	San	CIAL INSTR iples are from a n	on-rad s	site.					Matrix * S=Soli SE=Sealmen
Relinquished By/Remove	d From Date/Time  2	Received By/Stor	ed In ESISSIC 126	ate/Time	Mei	ICP Metals - 601 reury - 7470 - (C		Client List) (Arsenic	. Barium, Ca	dmium, Chromiur	n. Lead, Seleni	ium. Silver);	SO=Solid SI=Sindge W = Water O=OM A=Air
Relinquished By/Remove	d_12605 1000	Received By/Stor	00 III	ACCY I MINC									OS=Drum Solids DL=Drum Liquids
Relinquished By/Remove		Received By/Stor		ate/Time 05 /S	(0)	ersonnel not a	waitabi	le to					T=Tissec WI=Wipc L=Liquid \'=\'cpatasion
Relinquished By/Remove	d From Date/Time	Received By/Stor	red in D	ate/Time	( )	relinquish samp Ref #20 on	ples tro	om 3728					X=Other
Relinquished By/Remove	d From Date/Time	Received By/Sto	red In D	ate/Time	<b>—</b> ] '	(c: # <u>==</u> 01_	. , <u>c</u>	ر <u>ں ہو.</u>					
LABORATORY SECTION	Received By			Ti	ile			<del> </del>	· · · · · · · · · · · · · · · · · · ·		ī	Date/Time	
FINAL SAMPLE DISPOSITION	Disposal Method					Dispo	sed By					Date/Time	

**Data Validation Supporting Documentation** 

<u>V</u> ALIDATION LEVEL:	A	В	(c)	D	E
PROJECT: ) G	UBC 10	ピーパーに	DATA PACKAG	E: #299	8
VALIDATOR:	TLI	LAB: LL	<u>t</u>	DATE: 3/1	ده/ه
			SDG:	H2493	
		ANALYSES	PERFORMED		
SW-846/ICP	SW-846/GFAA	ŚW-846/Hg	SW-846 Cyanide		
SAMPLES/MAT	RIX	·			
JOZFLS	8 Jozf	L9 Ju	2FMO JO	2FM1	
JUZFMZ	Josf	МЗ			
	·-				
					Soil
Comments:					
2. INSTRUM			IBRATIONS (Lev	·-	Ves No N/A
Initial calibrations	•				J.
					Yes No N/A
ICV and CCV chec	ks performed on al	l instruments?		·····	Yes No N/A
ICV and CCV chec	ks acceptable?		***************************************	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Yes No N/A
Standards traceable	?			•••••••••••••••••••••••••••••••••••••••	Yes No N/A
-					Yes No N/A
Calculation check a	acceptable?	••••••	••••••		Yes No N/4
Comments:					$\overline{}$
			***		

3. BLANKS (Levels B, C, D, and E)			
ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes	No(	N/A
ICB and CCB results acceptable? (Levels D, E)	Yes	No(	NA)
Laboratory blanks analyzed?	(Ye)	No	N/A
Laboratory blank results acceptable?	Yes	(No	N/A
Field blanks analyzed? (Levels C, D, E)			
Field blank results acceptable? (Levels C, D, E)	Yes	Nd	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	MVA
Comments: CR - UT IN FM3		, <u>.</u>	$\overline{}$
FB - barrow, Chromium, lead			
4. ACCURACY (Levels C, D, and E)  MS/MSD samples analyzed?	(Ye)	No	N/A
MS/MSD results acceptable?		No	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	(N/A
MS/MSD standards expired? (Levels D, E)	Yes	No	N/A
LCS/BSS samples analyzed?			
LCS/BSS results acceptable?	Yes	No.	) N/A
Standards traceable? (Levels D, E)			
Standards expired? (Levels D, E)			
Transcription/calculation errors? (Levels D, E)	Yes	No	NΑ
Performance audit sample(s) analyzed?	Yes	NO	N/A
Performance audit sample results acceptable?	Yes	No	N/A
Comments: Barcom - 3970 Ms - Tall			
51 ver - 6990 LCS - Jal			
	NOO	45	

5. PRECISION (Levels C, D, and E)	
Duplicate RPD values acceptable?	Yes(No) N/A
Duplicate results acceptable?	Yes 🔞 N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards expired? (Levels D, E)	
Field duplicate RPD values acceptable?	Yes N/A
Field split RPD values acceptable?	Yes No NA
Transcription/calculation errors? (Levels D, E)	
Comments: Berum - R3D 73.66 Jal	
6. ICP QUALITY CONTROL (Levels D and E)	
ICP serial dilution samples analyzed?	
ICP serial dilution %D values acceptable?	
ICP post digestion spike required?	Yes No N/A
ICP post digestion spike values acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No NA
Transcription/calculation errors?	Yes No N/A
Comments:	

7.	FURNACE AA QUALITY CONTROL (Levels D and E)			
Dupli	icate injections performed as required?	Yes	No	N/A
Dupli	icate injection %RSD values acceptable?	Yes	No	N/A
Analy	ytical spikes performed as required?	Yes	No	N/A
Analy	ytical spike recoveries acceptable?	Yes	No	N/A
Stand	dards traceable?	Yes	No	N/A
Standa	dards expired?	Yes	No	N/A
MSA	performed as required?	Yes	No	N/A
MSA	results acceptable?	Yes	No	N/A
Trans	scription/calculation errors?	Yes	No	N/A
Comn	ments:			
-				
8.	HOLDING TIMES (all levels)			
Sampl	oles properly preserved?	(Yes)	No	N/A
Sampl	ole holding times acceptable?	(Yes	No	N/A
Comn	ments:			<del></del>
				<del> </del>

9. RESULT QUANTITATION AND DETECTION LIMITS (81)	
Results reported for all requested analyses?	Ye No N/A
Results reported for all requested analyses?  Rresults supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yeş No N/A
Detection limits meet RDL?	(Y)s
Detection limits meet RDL?  Transcription/calculation errors? (Levels D, E)	Yes No N/A
Comments:	

**Additional Documentation Requested by Client** 

#### INORGANICS METHOD BLANK DATA SUMMARY PAGE 02/10/05

CLIENT: TNUHANFORD B04-002 H2998

LVL LOT #: 0501L688

WORK ORDER: 11343-606-001-9999-00

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
	*************		*****			*
BLANK1	05L0067-MB1	Silver, Total	0.05	MG/KG	0.05	1.0
		Arsenic, Total	0.29 u	MG/KG	0.29	1.0
		Barium, Total	0.04	MG/KG	0.02	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	0.07	MG/KG	0.04	1.0
		Lead, Total	0.19 u	MG/KG	0.19	1.0
	•	Selenium, Total	0.40 น	MG/KG	0.40	1.0
BLANK1	05C0024-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1,0

#### INORGANICS ACCURACY REPORT 02/10/05

CLIENT: TNUHANFORD B04-002 H2998

LVL LOT #: 0501L688

WORK ORDER: 11343-606-001-9999-00

			SPIKED	INITIAL	SPIKED		DILUTION
SAMPLE	SITE ID	ANALYTE	SAMPLE	result	AMOUNT	*RECOV	FACTOR (SPK)
	*************			****			*****
-001	J02FLB	Silver, Total	5.2	0.05u	5.5	94.5	1.0
		Arsenic, Total	206	3.0	219	92.8	1.0
		Barium, Total	313	226	219	39.5	1.0
		Cadmium, Total	5.3	0.23	5.5	92.2	1.0
		Chromium, Total	31.7	11.7	21.9	91.3	1.0
		Hercury, Total	0.17	0.02u	0.17	100.6	1.0
		Lead, Total	58.4	8.1	54.8	91.8	1.0
		Selenium, Total	196	0.42u	219	89.6	1.0

### INORGANICS PRECISION REPORT 02/10/05

CLIENT: TNUHANFORD B04-002 H2998

LVL LOT #: 0501L688

WORK ORDER: 11343-606-001-9999-00

			INITIAL			DILUTION
SAMPLE	SITE ID	. ANALYTE	result	REPLICATE	RPD	FACTOR (REP)
	***********	***************		*******		***10078024
-001REP	J02FL8	Silver, Total	0.05u	0.05u	NC	1.0
		Arsenic, Total	3.0	3.0	0.00	1.0
		Barium, Total	226	105	73.6	1.0
		Cadmium, Total	0.23	0.23	0.26	1.0
		Chromium, Total	11.7	9.6	19.7	1.0
		Mercury, Total	0.02u	0.021	NC	1.0
		Lead, Total	8.1	8.1	0.00	1.0
		Selenium, Total	0.42u	0.43u	NC	1.0

#### INORGANICS LABORATORY CONTROL STANDARDS REPORT 02/10/05

CLIENT: TNUHANFORD B04-002 H2998 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0501L688

		,	SPIKED	SPIKED		
SAMPLE	SITE ID	ANALYTE	Sample	THUOMA	UNITS	*RBCOV
	************		=====		*****	
LCS1	05L0067-LC1	silver, LCS	34.6	50.0	MG/KG	69.2
		Armenic, LCS	949	1000	MG/KG	94.9
	•	Barium, LCS	491	500	MG/KG	98.1
		Cadmium, LCS	24.4	25.0	MG/KG	97.6
		Chromium, LCS	50.4	50.0	MG/KG	100.8
		Lead, LCS	248	250	MG/KG	99.2
		Selenium, LCS	931	1000	MG/KG	93.1
t.CS1	05C0024-LC1	Mercury, LCS	7.0	6.2		113.6